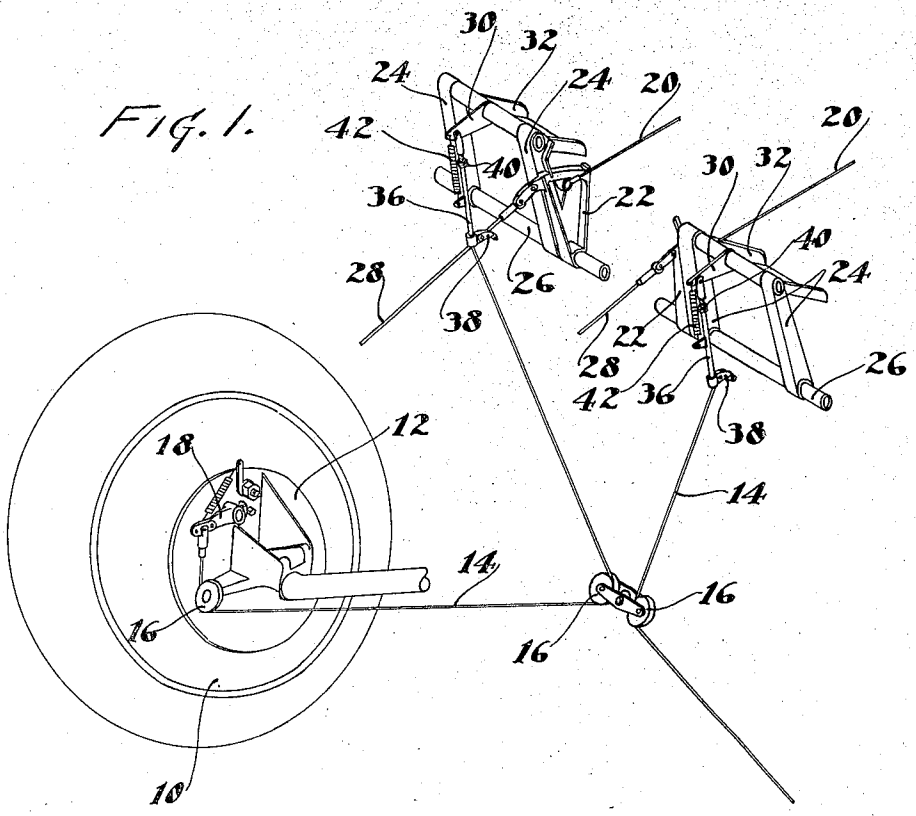
Aug. 23, 1932. W. A. RING ET AL 1,873,906

OPERATING MECHANISM

Filed Aug. 30, 1930

FIG. 1.



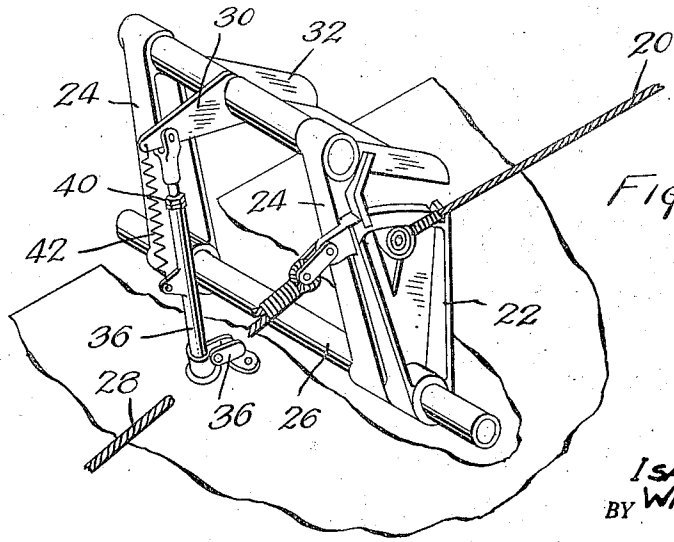


FIG. 2.

INVENTOR.
ISAAC M. LADDON
BY WILLIAM A. RING
ATTORNEY

Patented Aug. 23, 1932 1,873,906

UNITED STATES PATENT OFFICE

WILLIAM A. RING AND ISAAC M. LADDON, OF BUFFALO, NEW YORK, ASSIGNORS TO BENDIX BRAKE COMPANY, OF SOUTH BEND, INDIANA, A CORPORATION OF ILLINOIS

OPERATING MECHANISM

Application filed August 30, 1930. Serial No. 479,039.

This invention relates to operating means for brakes and the like, and is illustrated as embodied in means for operating the brakes of an airplane. In one arrangement for operating the brakes of an airplane, they are connected to pedals or the like mounted on and forming part of the rudder control mechanism, so that the pilot may steer on the ground by using the brakes without shifting his feet from the position occupied while steering in the air. Heretofore, the brake pedals or their equivalents have been, when the brakes are released, in a fixed relation to the axis of the rudder control, so that as the rudder is turned they may shift angularly relatively to the pilot's feet.

According to an important feature of the present invention, the brake pedals or their equivalents are maintained, when the brakes are released, at a constant angle with respect to the pilot's feet (i. e. with respect to the floorboard), by means causing them to shift with respect to the rudder controls when the latter are moved to different positions. For example, a parallelogram linkage may cause the pedals to maintain the desired relation to the pilot in all positions of the rudder controls.

The above and other objects and features of the invention, including various novel and desirable particular constructions, will be apparent from the following description of one illustrative embodiment shown in the accompanying drawing, in which:

Figure 1 is a diagrammatic isometric view of the brake and rudder controls, and associated parts, of an airplane fuselage; and

Figure 2 is a view of a portion of Figure 1, on a larger scale.

The airplane, of which portions are illustrated in the drawing, has the usual landing wheels 10 provided with suitable brakes 12 operated in the illustrated arrangement by tension cables 14 passing over guide pulleys 16 and connected to cam levers 18. The airplane also has a suitable rudder (not shown) operated by tension cables 20. Cables 20, which operate the rudder, are connected to levers 22 adjustably secured to operating levers 24, oscillatably mounted on axles 26 carried by the floorboard or other fixed part of the plane. Levers 22 are connected together by the rudder connections 20 and the rudder itself, and also usually by another cable 28 passing over a central pulley (not shown) arranged forwardly of the controls, so that as the right control is depressed the left must be raised, and vice versa.

The brake cables 14 or their equivalents are connected to lever arms 30 of pedals or the like 32 pivoted on the rudder controls 24, in such a manner as to form foot pads for the rudder controls and at the same time operating members for the brake controls. The present invention has to do with the provision of novel means for shifting the pedals 32 or their equivalents in a predetermined manner, with respect to the rudder controls and without affecting the brake controls, so that in any position of the rudder controls these pedals will be at the most advantageous position with respect to the pilot. Preferably, in most cases, this position is substantially the same, angularly, with respect to the pilot (and therefore with respect to the floorboard or other fixed part of the plane).

As one desirable means of securing this action, we may provide a member forming, with each rudder control lever 24, a parallelogram linkage. In the example illustrated, a tube or guide member 36 embracing the end of each cable 14 is pivoted to a bracket 38 secured to the floorboard (not shown), to turn about an axis paralleling the axis 26 and spaced forwardly thereof by a distance substantially equal to the lever arm 30. Nuts 40 threaded on the upper end of each tube 36 form an adjustable stop against which the corresponding lever 30 is urged by a return spring 42.

It will be seen that operation of the rudder, by pushing forwardly on one or the other of pedals 32, does not change the angular position of the pedal, this position being maintained by engagement of the pedal lever 30 with the stop 40 at the top of the guide 36, and also does not affect the brake controls since the length of cable 14 in the guide 36 is unchanged. On the other hand, depressing either pedal 32 in any position of the rudder will operate the corresponding

brake, so that either brake or both brakes may be operated at will by the pilot, for steering or retarding the plane when on the ground.

While one illustrative embodiment has been described in detail, it is not our intention to limit the scope of the invention to that particular embodiment, or otherwise than by the terms of the appended claims.

We claim:

1. Operating mechanism comprising a lever pivoted for movement about a first axis, a pedal mounted thereon and having a tension connection, and a guide for said connection pivoted for movement about a second axis paralleling the first axis and which predetermines the position of the pedal on the lever when the connection is not being operated.

2. Operating mechanism comprising a lever pivoted for movement about a first axis, a pedal mounted thereon, a cable connected to the pedal, and a guide for said cable pivoted for movement about a second axis paralleling the first axis and which predetermines the position of the pedal.

3. Operating mechanism comprising a lever pivoted for movement about a first axis, a pedal carried by the lever and pivoted thereon for movement about a second axis paralleling the first axis, a cable connected to the pedal, and a tubular guide embracing the portion of the cable adjacent the pedal and which guide is pivoted for movement about a third axis paralleling the first axis.

4. Operating mechanism comprising a lever pivoted for movement about a first axis, an operating cable connected to the lever, a pedal carried by the lever, a second cable connected to the pedal, and a tubular guide embracing the portion of the second cable adjacent the pedal and which guide is pivoted for movement about a second axis paralleling the first axis.

5. Operating mechanism comprising a lever pivoted for movement about a first axis, a pedal carried by the lever, a cable connected to the pedal, and a tubular guide embracing the portion of the cable adjacent the pedal and which guide is pivoted for movement about a second axis paralleling the first axis, said guide having a stop engaged by the pedal when tension on the cable is released.

6. Operating mechanism comprising a lever pivoted for movement about a first axis, an operating cable connected to the lever, a pedal carried by the lever, a second cable connected to the pedal, and a tubular guide embracing the portion of the second cable adjacent the pedal and which guide is pivoted for movement about a second axis paralleling the first axis, said guide having a stop engaged by the pedal when tension on the second cable is released.

7. Operating mechanism comprising a lever pivoted for movement about a first axis, a pedal carried by the lever, a cable connected to the pedal, and a tubular guide embracing the portion of the cable adjacent the pedal and which guide is pivoted for movement about a second axis paralleling the first axis, said guide having adjustably mounted thereon a stop engaged by the pedal when tension on the cable is released.

8. Operating mechanism comprising a lever pivoted for movement about a first axis, an operating cable connected to the lever, a pedal carried by the lever, a second cable connected to the pedal, and a tubular guide embracing the portion of the second cable adjacent the pedal and which guide is pivoted for movement about a second axis paralleling the first axis, said guide having adjustably mounted thereon a stop engaged by the pedal when tension on the second cable is released.

9. An operating mechanism comprising a pedal, a tubular guide pivoted at one end, a pedal stop at the other end, and a cable extending through the guide connected to the pedal.

In testimony whereof, we have hereunto signed our names.

WILLIAM A. RING.
ISAAC M. LADDON.